

Study Guide

For use with pages 10–13

GOAL Use powers to describe repeated multiplication.**VOCABULARY**

A **power** is the result of a repeated multiplication of the same factor. For example, the number 64 is a power because $64 = 4 \cdot 4 \cdot 4$. In the power 4^3 , the **base** is 4 and the **exponent** is 3. The *exponent* shows the number of times the *base* is used as a factor.

EXAMPLE 1 Using Exponents

Write the product using an exponent.

a. $20 \cdot 20 \cdot 20 \cdot 20 \cdot 20 = 20^5$

The base 20 is used as a factor 5 times.

b. $(0.6)(0.6)(0.6)(0.6)(0.6)(0.6) = (0.6)^6$

The base 0.6 is used as a factor 6 times.

c. $m \cdot m \cdot m = m^3$

The base m is used as a factor 3 times.**Exercises for Example 1**

Write the product using an exponent.

1. $21 \cdot 21 \cdot 21$

2. $d \cdot d \cdot d \cdot d \cdot d$

3. $(2.7)(2.7)(2.7)(2.7)$

Write the power in words and as a repeated multiplication. Then evaluate the power.

4. 2^6

5. 7^4

6. $(0.4)^3$

EXAMPLE 2 Evaluating Powers with VariablesEvaluate the expression y^3 when $y = 0.2$.**Solution**

$$\begin{aligned} y^3 &= (0.2)^3 \\ &= (0.2)(0.2)(0.2) \\ &= 0.008 \end{aligned}$$

Substitute 0.2 for y .

Use 0.2 as a factor 3 times.

Multiply.

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Exercises for Example 2Evaluate the expression when $h = 5$ and when $h = 0.3$.

7. h^2

8. h^4

9. h^5

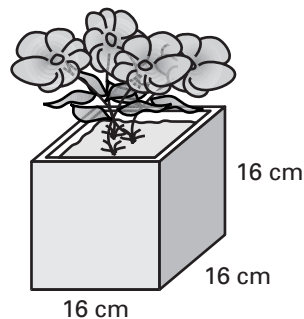
EXAMPLE 3 Using Powers in Formulas

A florist has a cube-shaped planter in which to plant flowers.
Find the volume of soil needed to fill the planter.

Solution

Use the formula for the volume of a cube.

$$\begin{aligned} V &= s^3 && \text{Write the formula.} \\ &= (16)^3 && \text{Substitute 16 for } s. \\ &= 4096 && \text{Evaluate power.} \end{aligned}$$

**Answer:** The volume of soil needed is 4096 cubic centimeters.**Exercises for Example 3**

Find the area of a square with the given side length.

10. 4.5 inches

11. 13 centimeters

Find the volume of a cube with the given edge length.

12. 8 meters

13. 3.4 yards